

What is claimed is:

1. A wavelength monitor, comprising:
a cylindrical lens configured to allow a laser beam emitted from a semiconductor laser to pass therethrough;
first and second photodetectors configured to receive the laser beam passed through the cylindrical lens; and
a wavelength filter disposed in an optical path between the semiconductor laser and the first photo detector.
2. A wavelength monitor according to claim 1, wherein the wavelength filter is disposed in the optical path between the cylindrical lens and the first photo detector.
3. A semiconductor laser device, comprising:
a semiconductor laser configured to emit a laser beam;
a cylindrical lens configured to allow the laser beam emitted from the semiconductor laser to pass therethrough;
first and second photodetectors configured to receive the laser beam passed through the cylindrical lens; and
a wavelength filter disposed in an optical path between the semiconductor laser and the first photo detector.
4. A semiconductor laser device according to claim 3, wherein the wavelength filter is a birefringence filter.

09988562-112001

5. A semiconductor laser device according to claim 3, wherein the wavelength filter is a birefringence filter comprising a YVO_4 crystal, a LiNbO_3 crystal and a polarizer.

6. A semiconductor laser device according to claim 3, wherein each of the first and second photodetectors has an elongated beam receiving face and wherein an elongation direction of each of the first and second photodetectors is oriented perpendicular to a center axis of the cylindrical lens.

7. A semiconductor laser device according to claim 3, wherein each of the first and second photodetectors has a rectangular beam receiving face, each rectangular beam receiving face having four sides, two of the sides of each rectangular beam receiving face being perpendicular to a center axis of the cylindrical lens.

8. A semiconductor laser device according to claim 3, wherein the wavelength filter is disposed in the optical path between the cylindrical lens and the first photodetector.

9. A semiconductor laser device according to claim 3, further comprising a beam shielding plate which has an aperture and which is arranged between the semiconductor laser and the first and second photodetectors.

10. A semiconductor laser device according to claim 3, further comprising a positioning member having two plane surfaces that contact the cylindrical lens.

11. A semiconductor laser device according to claim 3, further comprising a positioning member fixed to the cylindrical lens with a gold-tin alloy or with a glass material having a low melting point.

09988662-12001

12. A semiconductor laser device according to claim 3, wherein at least one of the first and second photodetectors has a plurality of photodiodes.

13. A semiconductor laser device according to claim 3, further comprising:

a temperature-keeping device to which the semiconductor laser is directly or indirectly attached; and

a control circuit configured to control the temperature-keeping device according to a ratio of an intensity of the laser beam received by the second photodetector to an intensity of the laser beam received by the first photodetector.

14. A semiconductor laser device according to claim 3, further comprising:

a temperature-detecting unit configured to measure a temperature of the semiconductor laser;

a temperature-keeping device to which the semiconductor laser is directly or indirectly attached; and

a control circuit configured to control the temperature-keeping device according to the temperature of the semiconductor laser measured by the temperature-detecting unit and according to a ratio of an intensity of the laser beam received by the second photodetector to an intensity of the laser beam received by the first photodetector.

15. A semiconductor laser device according to claim 3, further comprising:

a temperature-detecting unit configured to measure a temperature of the semiconductor laser;

09988662-12001

a temperature-keeping device to which the semiconductor laser is directly or indirectly attached; and

a control circuit configured to control the temperature-keeping device according to the temperature of the semiconductor laser measured by the temperature-detecting unit and an intensity of the laser beam received by the second photodetector.

16. A semiconductor laser device according to claim 3, further comprising a control circuit configured to control the semiconductor laser according to an intensity of the laser beam received by the second photodetector.

17. A semiconductor laser device according to claim 3, wherein the first photodetector and the second photodetector are disposed adjacent to each other in a direction parallel to a center axis of the cylindrical lens.

18. A semiconductor laser device according to claim 17, wherein a beam diameter of the laser beam passed through the cylindrical lens in a first direction parallel to the center axis of the cylindrical lens in a plane that includes a beam receiving face of the first photodetector and a beam receiving face of the second photodetector is longer than a summed length of both the beam receiving face of the first photodetector and the beam receiving face of the second photodetector in the first direction, and wherein a beam diameter of the laser beam passed through the cylindrical lens in a second direction perpendicular to the first direction in the plane that includes the beam receiving faces of the first and second photodetectors is shorter than a length of any of the beam receiving faces of the first and second photodetectors in the second direction.

0998662-12001

19. A semiconductor laser device according to claim 3, wherein the beam receiving faces of the first and second photodetectors are inclined relative to a plane perpendicular to an optical axis of the semiconductor laser device.

20. A semiconductor laser device according to claim 19, wherein a beam diameter of the laser beam passed through the cylindrical lens in a first direction parallel to the center axis of the cylindrical lens in a plane that includes a beam receiving face of the first photodetector and a beam receiving face of the second photodetector is longer than a summed length of both the beam receiving face of the first photodetector and the beam receiving face of the second photodetector in the first direction, and wherein a beam diameter of the laser beam passed through the cylindrical lens in a second direction perpendicular to the first direction in the plane that includes the beam receiving faces of the first and second photodetectors is shorter than a length of any of the beam receiving faces of the first and second photodetectors in the second direction.

21. A semiconductor laser device according to claim 19, wherein the beam receiving faces of the first and second photodetectors are inclined relative to the plane perpendicular to the optical axis of the semiconductor laser device by an angle larger than a maximum angle formed between the laser beam passed through the cylindrical lens and the optical axis of the semiconductor laser device.

22. A semiconductor laser device according to claim 19, wherein an optical length between the semiconductor laser device and an intersection of the optical axis of the semiconductor laser and a plane that includes beam receiving faces of the first and second photodetectors is expressed by L , an optical length between

09988882-112001

the optical axis of the semiconductor laser device and a position of the beam receiving faces of the first and second photodetectors farthest from the optical axis of the semiconductor laser device is expressed by D , and the beam receiving faces of the first and second photodetectors are inclined by an angle larger than $\tan^{-1}(D/L)$ relative to the plane perpendicular to the optical axis of the semiconductor laser device.

23. A semiconductor laser device according to claim 19, wherein a center axis of the cylindrical lens is shifted relative to the optical axis of the semiconductor laser device.

24. A semiconductor laser device according to claim 3, wherein the cylindrical lens has a cut-out surface.

25. A semiconductor laser device according to claim 24, wherein a flat portion of the cut-out surface is oriented substantially parallel to an optical axis of the semiconductor laser device.

26. A semiconductor laser device according to claim 24, further comprising a positioning member that contacts the cut-out surface.

27. A semiconductor laser device according to claim 24, wherein the laser beam enters a first cylindrical surface portion of the cylindrical lens adjacent to a first edge of the cut-out surface and exits a second cylindrical surface portion of the cylindrical lens adjacent to a second edge of the cut-out surface.

28. A semiconductor laser device according to claim 27, wherein the first and second cylindrical surface portions each have an antireflection coating.

29. A semiconductor laser device according to claim 3, further comprising an L-shaped positioning member that contacts a cylindrical surface of the cylindrical lens at two locations on the cylindrical lens.

30. A semiconductor laser device according to claim 29, wherein each of the first and second photodetectors has an elongated beam receiving face and wherein an elongation direction of each of the first and second photodetectors is oriented perpendicular to a center axis of the cylindrical lens.

31. A semiconductor laser device according to claim 30, wherein a beam diameter of the laser beam passed through the cylindrical lens in a first direction parallel to the center axis of the cylindrical lens in a plane that includes a beam receiving face of the first photodetector and a beam receiving face of the second photodetector is longer than a summed length of both the beam receiving face of the first photodetector and the beam receiving face of the second photodetector in the first direction, and wherein a beam diameter of the laser beam passed through the cylindrical lens in a second direction perpendicular to the first direction in the plane that includes the beam receiving faces of the first and second photodetectors is shorter than a length of any of the beam receiving faces of the first and second photodetectors in the second direction.

32. A semiconductor laser device according to claim 31, wherein the cylindrical lens has a cut-out surface and wherein a flat portion of the cut-out surface is oriented substantially parallel to an optical axis of the semiconductor laser device.

33. A semiconductor laser device according to claim 3, further comprising:

09088662-112001

a package wherein the semiconductor laser, the first and second photodetectors and the wavelength filter are housed therein; and

a wedge-shaped window attached to the package and having a wedge-shaped cross section,

wherein the semiconductor laser is configured to further emit another laser beam which is transmitted outside the package through the wedge-shaped window.

34. A semiconductor laser device according to claim 33, further comprising:

another lens which is arranged between the semiconductor laser and the wedge-shaped window and which is separated from the wedge-shaped window such that the another lens does not receive a reflected portion of the another laser beam reflected by the wedge-shaped window.

35. A semiconductor laser device according to claim 33, wherein the wedge-shaped window has an inclined surface which is inclined relative to a direction perpendicular to an optical axis of the semiconductor laser device.

36. A semiconductor laser device according to claim 35, wherein the package has a bottom portion supporting the semiconductor laser and wherein the inclined surface faces the bottom portion of the package.

37. A semiconductor laser device, comprising:

a semiconductor laser configured to emit a laser beam;

a cylindrical lens configured to allow a laser beam emitted from a semiconductor laser to pass therethrough;

0998662-12001

intensity changing means for changing the intensity of a portion of the laser beam depending upon the wavelength of the laser beam, the intensity changing means being disposed in an optical path between the semiconductor laser and the detecting means.

39. A method of monitoring the wavelength of a laser beam emitted by a semiconductor laser, comprising:

directing a first portion of the uniaxially converged laser beam through a wavelength filter to a first photodetector;

determining a signal intensity ratio of a first signal intensity measured by the first photodiode to a second signal intensity measured by the second photodiode; and

comparing the signal intensity ratio to a reference signal intensity ratio that corresponds to a present wavelength.